# Space Nutrition

Volume 3 — Are you hungry for space food? — Issue 8


## Cosmic Rays

Have you ever had an X-ray? X-rays are one form of radiation that is helpful in medicine. The Space Radiation Laboratory (SRL) looks at the exposure that the astronauts receive while they are in orbit, to other forms of radiation , such as cosmic radiation. These forms of radiation can be harmful by damaging the DNA in your cells. These cells can reproduce to form cancerous ones, and tissues and the immune system can be damaged. Scientists in the SRL investigate ways to protect space crews from cosmic radiation. The Earth's atmosphere and magnetic field protect us from most cosmic radiation. As NASA works to send manned space flight missions back to the Moon or to Mars (outside of the Earth's magnetic field), radiation protection for crew members remains one of the key problems that must be solved.

## Curiosity Corner

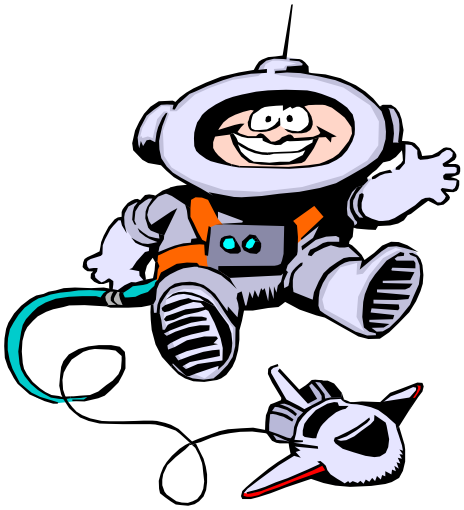
**Alexandra from Pennsylvania asks,**
"I heard that food doesn't always taste the same in space. Why is that?"

Some of the crew members tell us that food doesn't taste the same on orbit. They often say, for example, that the drinks are a lot sweeter. We don't know exactly why, but it may be related to the fact that taste depends on smell. (How does food taste when you have a cold and are congested?) The air inside the spacecraft doesn't move, as it does on the ground. Also, the fluid shifts in space flight cause astronauts to feel congested, and when your nose is congested, air isn't moving across your smell receptors. So effects of space flight on smell may be one of the reasons that taste changes. Sounds like a great idea for an experiment!

**Send your comments or questions to:**


Space Nutrition Newsletter
Nutritional Biochemistry Laboratory
Mail Code SK3
NASA - Johnson Space Center
Houston, TX 77058


**There are many challenges in developing space foods, including making sure that they are tasty, have good nutrient content, and can be prepared easily. One of the biggest challenges - especially as we begin to think about sending humans to the Moon and Mars - is shelf life (how long the foods will be fresh). Even for an International Space Station flight, the foods have to be able to sit on the shelf (and still be tasty) for at least 9 months! It will be even longer for a Mars mission. Can you imagine going to the grocery store, filling your pantry with food - and not going back to the store for a year, or two or three?**



**This is another success story for food scientists in the Space Food Systems Laboratory at Johnson Space Center. They have developed special tortillas that taste good after almost a year! Tortillas in space work great (a sandwich with two slices of bread would take three hands to make - otherwise one slice will float away!). They keep these fresh with special packaging that includes an oxygen scavenger. An oxygen scavenger is a chemical that traps any oxygen, and prevents mold from growing.**

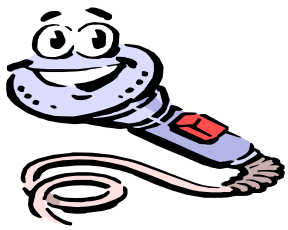
## Did you know?

- Some space foods are irradiated. These foods are packaged and exposed to a source of radiation that kills any mold or bacteria on the food, allowing it to be safe to eat for a long time!
- The type of radiation used to protect space foods does not have any bad effects. This is a very safe process for foods.
- The spacecraft (and astronauts) are shielded from most harmful cosmic radiation. This shielding prevents astronauts from getting vitamin D from sunlight as they would here on Earth. We have to take extra care to make sure atsronauts get enough vitamin D from foods.
- Some forms of cosmic radiation do get through the craft. In addition to being a concern for the health of the astronauts, it is also a concern for the food. Radiation might affect vitamins and nutrients in the food before it is eaten - and the foods might not taste good, or might have fewer nutrients than we think.

## Word of the Month

**pH**

**Can you guess what this word means? Look for the meaning of the "Word of the Month" in the next issue of Space Nutrition.**

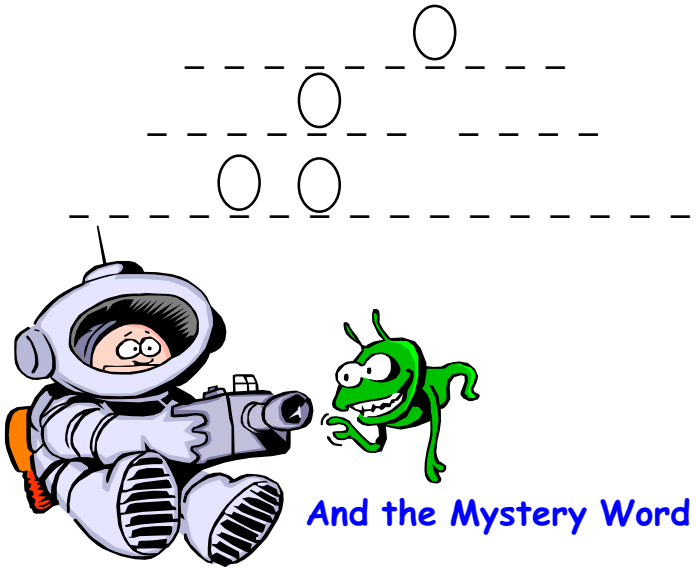


## FUN CORNER

### Do you know the Mystery Word?

**In Issue 7, we read, "Most space foods are either _____, in _____ _____, or _____ (heated to high temperatures and packaged in cans or closed pouches".**
**Use these 3 types of space foods to fill in the blanks below. Then rearrange the circled letters to find the mystery word.**

**(Clue: Opportunity and Spirit's destination).**

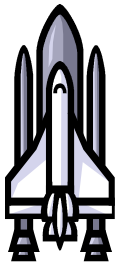


And the Mystery Word is?

___ ___ ___ ___

**Check out these cool NASA links for more fun space science and space food facts!**

http://spaceflight.nasa.gov/spacenews/factsheets/
http://www.nasa.gov/audience/forkids/index.html
http://edspace.nasa.gov/index.html
http://www.spaceflight.nasa.gov
http://srag-nt.jsc.nasa.gov



**Check out the Nutritional Biochemistry Laboratory's website for more information about nutrition and space.**

http://haco.jsc.nasa.gov/biomedical/nutrition/